

What is claimed is:

1. A method for storing data in a write-once memory device, the method comprising:
  - (a) storing data in a write-once memory device during a first session;
  - (b) storing a first set of file system structures for a write-many file system in the write-once memory device, the first set of file system structures being associated with the data stored in the write-once memory device during the first session;
  - (c) storing data in the write-once memory device during a second session;
  - (d) storing a second set of file system structures for the write-many file system in the write-once memory device, the second set of file system structures being associated with the data stored in the write-once memory device during both the first and second sessions; and
  - (e) storing a pointer to a memory address storing a file system structure of the second set of file system structures in the write-once memory device.
2. The invention of Claim 1, wherein the write-many file system comprises a DOS FAT file system.
3. The invention of Claim 1, wherein (e) comprises storing a pointer to a memory address storing a master boot record.
4. The invention of Claim 1, wherein (e) comprises storing a pointer to a memory address storing a partition boot record.
5. The invention of Claim 1, wherein the second set of file system structures comprises a master boot record and at least one other file system structure, and wherein (e) comprises storing a pointer only to a memory address storing the master boot record.
6. The invention of Claim 5, wherein the at least one other file system structure is selected from the group consisting of a partition boot record, a file allocation table, and a root directory.

7. The invention of Claim 1 further comprising storing an additional pointer to a memory address storing an additional file system structure of the second set of file system structures.

5

8. The invention of Claim 7, wherein the first-mentioned pointer indicates a memory address storing a file allocation table, and wherein the additional pointer indicates a memory address storing a file system structure selected from the group consisting of a master boot record, a partition boot record, and a root directory.

10

9. The invention of Claim 8, wherein the additional pointer indicates a memory address storing a root directory.

15

10. The invention of Claim 1 further comprising storing first and second sets of file system structures for a write-once file system in the write-once memory device, the first set being associated with the data stored in the write-once memory device during the first session and the second set being associated with the data stored in the write-once memory device during both the first and second sessions.

20

11. The invention of Claim 1 further comprising removing the write-once memory device from a data storage device between the first and second sessions.

12. The invention of Claim 1, wherein at least one of (d) and (e) is performed by a controller in the write-once memory device.

25

13. The invention of Claim 1, wherein at least one of (d) and (e) is performed by hardware in a data storage device.

14. The invention of Claim 1, wherein at least one of (d) and (e) is performed by software in a data storage device.

30

15. A method for reading data in a write-once memory device using a write-many file system, the method comprising:

(a) providing a write-once memory device and a reading device, wherein the reading device uses a write-many file system and wherein the write-once memory device comprises:

data stored during first and second sessions;

a first set of file system structures for the write-many file system, the first set of file system structures being associated with the data stored during the first session;

a second set of file system structures for the write-many file system, the second set of file system structures being associated with the data stored during the first and second sessions; and

a pointer to a memory address storing a file system structure of the second set of file system structures;

(b) sending a command from the reading device to read a memory address of the write-once memory device, wherein the write-many file system expects the memory address to contain a file system structure associated with the data stored during both the first and second sessions and wherein the memory address differs from the memory address indicated by the pointer; and

(c) returning the file system structure stored in the memory address indicated by the pointer instead of data stored in the memory address requested by the reading device.

16. The invention of Claim 15, wherein the write-many file system comprises a DOS FAT file system.

17. The invention of Claim 15, wherein (b) comprises sending a command from the reading device to read memory address zero.

18. The invention of Claim 15, wherein the memory address indicated by the pointer stores a master boot record.

19. The invention of Claim 15, wherein the memory address indicated by the pointer stores a partition boot record.

20. The invention of Claim 15, wherein the second set of file system structures comprises a master boot record and at least one other file system structure.

21. The invention of Claim 20, wherein the at least one other file system structure is selected from the group consisting of a partition boot record, a file allocation table, and a root directory.

22. The invention of Claim 15, wherein the write-once memory device stores an additional pointer to a memory address storing an additional file system structure of the second set of file system structures.

23. The invention of Claim 22, wherein the first-mentioned pointer indicates a memory address storing a file allocation table, and wherein the additional pointer indicates a memory address storing a file system structure selected from the group consisting of a master boot record, a partition boot record, and a root directory.

24. The invention of Claim 23, wherein the additional pointer indicates a memory address storing a root directory.

25. The invention of Claim 15, wherein the write-once memory device further stores first and second sets of file system structures for a write-once file system, the first set being associated with the data stored in the write-once memory device during the first session and the second set being associated with the data stored in the write-once memory device during both the first and second sessions.

26. The invention of Claim 15, wherein the memory device comprises a controller and a register, wherein the pointer is stored in a memory array of the memory device, and wherein the invention further comprises, with the controller:

5           reading the pointer stored in the memory array;  
          storing the pointer in the register; and  
          reading the memory location indicated by the pointer stored in the register instead of the memory address requested by the reading device.

10       27. The invention of Claim 26, wherein the pointer is read using a temporal-to-spatial mapping technique.

15       28. The invention of Claim 26, wherein the pointer is read by a controller in the write-once memory device.

20       29. The invention of Claim 26, wherein the pointer is read by hardware in the data reading device.

25       30. The invention of Claim 26, wherein the pointer is read by software in the data reading device.

30       31. A method for reading data in a write-once memory device using a DOS FAT file system, the method comprising:

- 25           (a) storing data in a write-once memory device during a first session;  
          (b) storing a first set of file system structures for a DOS FAT file system in the write-once memory device, the first set of file system structures being associated with the data stored in the write-once memory device during the first session;  
          (c) storing data in the write-once memory device during a second session;  
          (d) storing a master boot record associated with the data stored in the write-once memory device during both the first and second sessions;
- 30

(e) storing a pointer to a memory location storing the master boot record in the write-once memory device;

(f) connecting the write-once memory device to a reading device using the DOS FAT file system;

5 (g) sending a command from the reading device to read memory address zero of the write-many memory device;

(h) returning the master boot record stored in the memory address indicated by the pointer instead of data stored in memory address zero.

10 32. The invention of Claim 31, wherein (e) comprises storing a pointer only to the memory address storing the master boot record.

33. The invention of Claim 31, wherein (e) is performed by a controller in the write-once memory device.

15 34. The invention of Claim 31, wherein (e) is performed by hardware in a data storage device storing the second set of file system structures in the write-once memory device.

35. The invention of Claim 31, wherein (e) is performed by software in a data storage device storing the second set of file system structures in the write-once memory device.

20 36. The invention of Claim 31, wherein the pointer is read by a controller in the write-once memory device.

25 37. The invention of Claim 31, wherein the pointer is read by hardware in the reading device.

38. The invention of Claim 31, wherein the pointer is read by software in the reading device.

39. A method for reading data in a write-once memory device using a DOS FAT file system, the method comprising:

- (a) storing data in a write-once memory device during a first session;
- (b) storing a first set of file system structures for a DOS FAT file system in the write-once memory device, the first set of file system structures being associated with the data stored in the write-once memory device during the first session;
- (c) storing data in the write-once memory device during a second session;
- (d) storing a partition boot record associated with the data stored in the write-once memory device during both the first and second sessions;
- (e) storing a pointer to a memory location storing the partition boot record in the write-once memory device;
- (f) connecting the write-once memory device to a reading device using the DOS FAT file system;
- (g) sending a command from the reading device to read a memory address that the reading device expects to find the partition boot record; and
- (h) returning the partition boot record stored in the memory address indicated by the pointer instead of data stored in the memory address requested by the reading device.

40. The invention of Claim 39, wherein (e) comprises storing a pointer only to the memory address storing the partition boot record.

41. The invention of Claim 39, wherein (e) is performed by a controller in the write-once memory device.

42. The invention of Claim 39, wherein (e) is performed by hardware in a data storage device storing the second set of file system structures in the write-once memory device.

43. The invention of Claim 39, wherein (e) is performed by software in a data storage device storing the second set of file system structures in the write-once memory device.

44. The invention of Claim 39, wherein the pointer is read by a controller in the write-once memory device.

45. The invention of Claim 39, wherein the pointer is read by hardware in the reading device.

46. The invention of Claim 39, wherein the pointer is read by software in the reading device.

47. A method for reading data in a write-once memory device using a DOS FAT file system, the method comprising:

- (a) storing data in a write-once memory device during a first session;
- (b) storing a first set of file system structures for a DOS FAT file system in the write-once memory device, the first set of file system structures being associated with the data stored in the write-once memory device during the first session;
- (c) storing data in the write-once memory device during a second session;
- (d) storing a file allocation table and a root directory associated with the data stored in the write-once memory device during both the first and second sessions;
- (e) storing pointers to the memory locations storing the file allocation table and the root directory;
- (f) connecting the write-once memory device to a reading device using the DOS FAT file system;
- (g) sending a command from the reading device to read the memory addresses that the reading device expects to find the file allocation table and the root directory; and
- (h) returning the file allocation table and the root directory stored in the memory addresses indicated by the pointers instead of data stored in the memory addresses requested by the reading device.



48. The invention of Claim 47, wherein (e) is performed by a controller in the write-once memory device.

49. The invention of Claim 47, wherein (e) is performed by hardware in a data storage device storing the second set of file system structures in the write-once memory device.

50. The invention of Claim 47, wherein (e) is performed by software in a data storage device storing the second set of file system structures in the write-once memory device.

51. The invention of Claim 47, wherein the pointer is read by a controller in the write-once memory device.

52. The invention of Claim 47, wherein the pointer is read by hardware in the reading device.

53. The invention of Claim 47, wherein the pointer is read by software in the reading device.

54. A method for reading data in a write-once memory device using a write-many file system, the method comprising:

(a) preventing an overwriting of a first set of file system structures of a write-many file system by a second set of file system structures of the write-many file system by redirecting data between a data storage device and a write-once memory device; and

(b) returning at least one of the second set of file system structures instead of at least one of the first set of file system structures by redirecting data between a data reading device and the write-once memory device.

55. The invention of Claim 54, wherein the at least one of the second set of file system structures comprises an up-to-date master boot record and wherein at least one of the first set of file system structures comprises an out-of-date master boot record.

56. The invention of Claim 54, wherein the at least one of the second set of file system structures comprises an up-to-date partition boot record and wherein at least one of the first set of file system structures comprises an out-of-date partition boot record.

5 57. The invention of Claim 54, wherein the at least one of the second set of file system structures comprises an up-to-date file allocation table and root directory and wherein at least one of the first set of file system structures comprises an out-of-date file allocation table and root directory.

10 58. The invention of Claim 54, wherein (a) is performed by a controller in the write-once memory device.

15 59. The invention of Claim 54, wherein (a) is performed by hardware in a data storage device.

60. The invention of Claim 54, wherein (a) is performed by software in a data storage device.

20 61. The invention of Claim 54, wherein (b) is performed by a controller in the write-once memory device.

62. The invention of Claim 54, wherein (b) is performed by hardware in a data reading device.

25 63. The invention of Claim 54, wherein (b) is performed by software in a data reading device.

64. A method for reading data in a write-once memory device using a write-many file system, the method comprising:

30 (a) storing data in a write-once memory device during a first session;

(b) storing a first set of file system structures for a write-many file system in a first set of available memory cells in a file system structure portion of the write-once memory device, the first set of file system structures being associated with the data stored in the write-once memory device during the first session;

5 (c) storing data in the write-once memory device during a second session; and

(d) storing a second set of file system structures for the write-many file system in a second set of available memory cells in a file system structure portion of the write-once memory device, the second set of file system structures being associated with the data stored in the write-once memory device during both the first and second sessions; wherein the first set of available memory cells is adjacent to the second set of available memory cells.

65. The invention of Claim 64 further comprising locating the second set of file system structures by locating an adjacent set of available memory cells of a fixed offset.

66. A method for storing data and file system structures of a write-many file system in a memory device, the method comprising:

(a) storing data in a write-once memory array of a memory device; and  
(b) storing a file system structure of a write-many file system in a write-many memory array of the memory device.

67. The invention of Claim 66, wherein the write-many file system comprises a DOS FAT file system.

25 68. The invention of Claim 66, wherein the file system structure is selected from the group consisting of a master boot record, a partition boot record, a file allocation table, and a root directory.

69. The invention of Claim 66 further comprising storing a file system structure of a write-once file system in the write-once memory array.

70. The invention of Claim 66 further comprising:

- (c) storing additional data in the write-once memory array; and
- (d) re-writing the file system structure stored in the write-many memory array.

5

71. The invention of Claim 66, wherein at least one of (a) and (b) is performed by a controller in the memory device.

72. The invention of Claim 66, wherein at least one of (a) and (b) is performed by a hardware in a data storage device.

10

73. The invention of Claim 66, wherein at least one of (a) and (b) is performed by a software in a data storage device.

74. A method for reading data in a memory device using a write-many file system, the method comprising:

- (a) providing a memory device and a reading device, wherein the reading device uses a write-many file system and wherein the memory device comprises a write-once memory array storing data and a write-many memory array storing a file system structure of a write-many file system;
- (b) reading the file system structure of the write-many file system stored in the write-many memory array; and
- (c) reading the data stored in the write-once memory array.

15

20

75. The invention of Claim 74, wherein the write-many file system comprises a DOS FAT file system.

25

76. The invention of Claim 74, wherein the file system structure is selected from the group consisting of a master boot record, a partition boot record, a file allocation table, and a root directory.

30

77. The invention of Claim 74 further comprising reading a file system structure of a write-once file system from the write-once memory array.

78. The invention of Claim 74, wherein at least one of (b) and (c) is performed by a controller in the memory device.

79. The invention of Claim 74, wherein at least one of (b) and (c) is performed by a hardware in a data reading device.

80. The invention of Claim 74, wherein at least one of (b) and (c) is performed by a software in a data reading device.

81. The invention of Claim 1, 15, 31, 39, or 47, wherein the pointer is stored in a table.

82. The invention of Claim 1, 15, 31, 39, or 47, wherein the pointer is stored in a field associated with a sector of data.

83. The invention of Claim 1, 15, 31, 39, 47, 54, 63, 66, or 74, wherein the write-once memory device comprises a three-dimensional memory array.

84. The invention of Claim 1, 15, 31, 39, 47, 54, 63, 66, or 74, wherein the write-once memory device comprises a two-dimensional memory array.

85. The invention of Claim 1, 15, 31, 39, 47, 54, 63, 66, or 74, wherein the write-once memory device comprises a solid-state memory device.

86. The invention of Claim 1, 15, 31, 39, 47, 54, 63, 66, or 74, wherein the write-once memory device comprises an optical memory device.

87. The invention of Claim 54, wherein the data storage device comprises a device selected from the group consisting of a digital audio player, a digital audio book, an electronic book, a digital camera, a game player, a general-purpose computer, a personal digital assistant, a portable telephone, a printer, and a projector.

88. The invention of Claim 15, 31, 39, 47, 54, or 74, wherein the data reading device comprises a device selected from the group consisting of a digital audio player, a digital audio book, an electronic book, a digital camera, a game player, a general-purpose computer, a personal digital assistant, a portable telephone, a printer, and a projector.

89. The invention of Claim 1, 15, 31, 39, 47, or 63, wherein the data stored in at least one of the first or second sessions comprises data selected from the group consisting of digital music, digital audio, digital video, at least one digital still image, a sequence of digital images, digital books, digital text, a digital map, games, software, or any combination thereof.

90. The invention of Claim 66 or 74, wherein the write-many memory array comprises an electrically-erasable programmable read-only memory.

91. The invention of Claim 66 or 74, wherein the write-many memory array comprises Flash memory.